

BMP #13 - Geotextile

Targeted Pollutants	
<input checked="" type="radio"/>	Sediment
<input type="radio"/>	Phosphorus
<input type="radio"/>	Trace metals
<input type="radio"/>	Bacteria
<input type="radio"/>	Petroleum hydrocarbons

Physical Limits	
Drainage area	<u>100 ac</u>
Max slope	<u>100%</u>
Min bedrock depth	<u>N/A</u>
Min water table	<u>N/A</u>
SCS soil type	<u>ABCD</u>
Freeze/Thaw	<u>good</u>
Drainage/Flood control	<u>no</u>

DESCRIPTION

Geotextiles are porous fabrics known in the construction industry as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles are manufactured by weaving or bonding fibers made from synthetic materials such as polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass, and various mixtures of these materials.

The material is applied from a roll and anchored into place to provide a continuous sheet over the exposed slope or surface. This sheeting reduces raindrop impact and surface erosion on disturbed soils. It can also protect new vegetation and aid in growth and establishment of vegetation by retarding evaporation of soil moisture. They can also be used on benched slopes.

Geotextiles are used for a variety of purposes as separators or reinforcement, for filtration and drainage, and for erosion control on slopes or stream banks.

Matting or netting made of biodegradable materials (such as jute, wood fiber, straw, coconut, paper, or cotton) can be used for many of these same purposes, but is not as durable. These products are discussed separately under BMP #14-Matting.

APPLICATIONS

Geotextiles are an effective tool to prevent surface erosion and promote rapid establishment of a permanent (or temporary) vegetative cover. The two main applications are for slope protection and as a flexible channel lining. For slope protection applications, the fabrics are useful in preventing the loss of top soil, thereby reducing surface erosion and promoting establishment of vegetative cover. They should be given serious consideration where slope, high flows, or other factors prevent use of organic matting.

Used alone, geotextiles can function as erosion control matting to stabilize channels and swales or to protect recently-planted seedlings until they become established. They may be placed in ditches or along stream banks to protect new plantings if more elaborate measures such as riprap or rock revetments are not appropriate. The purpose of this application is to protect the integrity of the ditch or stream while permanent vegetative cover becomes established.

Geotextiles are also used as separators. An example of such a use is geotextile as a separator between riprap and soil. This "sandwiching" prevents the soil from being eroded from beneath the riprap.

The primary advantages of geotextiles are:

- Relatively low cost for many applications.
- Ease and convenience for many applications.
- Quick and effective protection against erosion problems.
- Design methodologies are available for many uses.

- A wide variety of geotextile products is available to match specific needs.
- Synthetic geotextiles may be removed and reused if economically feasible.
- Better resistance to high flow situations than organic matting.

LIMITATIONS

- Effectiveness may be reduced drastically if the fabric is not properly selected, designed, or installed.
- Many synthetic geotextiles are sensitive to light and must be protected prior to installation.
- Geotextiles that are not biodegradable should not be used where their presence or appearance is aesthetically unacceptable.
- Should not be placed on 1:1 (50%) slopes if they are to be covered with overlying material.

DESIGN PARAMETERS

Maximum slope steepness: Products are available for up to 1:1 steepness.

Durability/decomposition: Some synthetic geotextiles persist a very long time and should be considered a permanent measure. Others remain effective for less than a year. Those types designed to assist in establishment of vegetation will eventually photodegrade or decompose. If a short-term, degradable product is needed, see BMP #14-Matting.

Materials: In determining how much fabric is needed, allow for an overlap of 4 in (100 mm) on both sides of each roll and 3 ft (1 m) at the ends of rolls. Also, the fabric should extend beyond the edge of the exposed area at least 1 ft (300 mm) at the sides and 3 feet (1 m) at the top and bottom. Staples should be of 1/10 in (3 mm) diameter (or heavier) steel wire. Allow for a spacing of approximately 5 ft (1.5 m) apart along the sides and center of each roll and not more than 1 ft (300 mm) apart along upper end of a roll or at the overlap of two rolls.

CONSTRUCTION GUIDELINES

- The soil must be reasonably smooth. Fill and compact any rills and gullies. Remove protruding rocks and other obstructions.
- Apply the individual rolls up and down the slope, from the top to the bottom--never along the contour.
- Overlap the sides of rolls at least 4 in (100 mm), and make sure there is at least a 3 ft (1 m) overlap when an uphill roll joins to a downhill roll. The uphill roll should overlie the downhill roll.
- Extend the fabric beyond the edge of the mulched or seeded area at least 300 mm at the sides and 3 ft (1 m) at the top and bottom of the area. If existing vegetation or structures mark the boundaries of the area, the fabric should continue into the stable vegetated area or to the edge of the structure.

- At the top of the area, bury the end of each roll in a trench at least 8 in (200 mm) deep. The trench should then be backfilled and tamped.
- Staples should be driven perpendicularly into the slope face. Place them approximately 5 ft (1.5 m) apart down the sides and center of the roll, and not more than 1 ft (300 mm) apart at the upper end of a roll or at the end overlap of two rolls.
- Be sure the fabric makes uniform contact with the slope face underneath. No "bridging" of rills or gullies should be allowed.

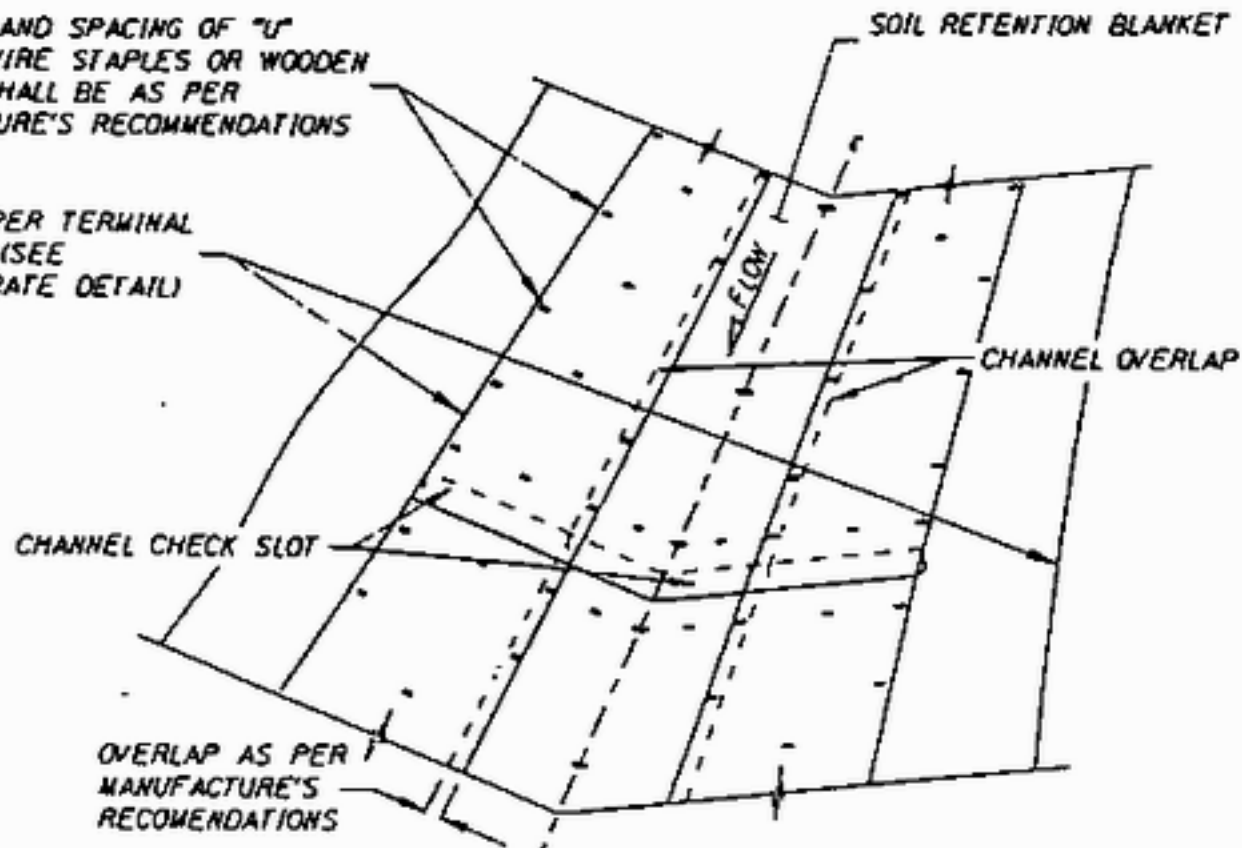
MAINTENANCE

Inspect weekly or monthly and within 24 hours after each runoff-producing storm. To assure proper functioning, complete one inspection during the first runoff-producing event after installation. If fabric sheeting is damaged or missing, replace it immediately to restore full protection. Also inspect to ensure that channelization and erosion is not occurring underneath fabric (sediment outwash is the most visible sign of this.)

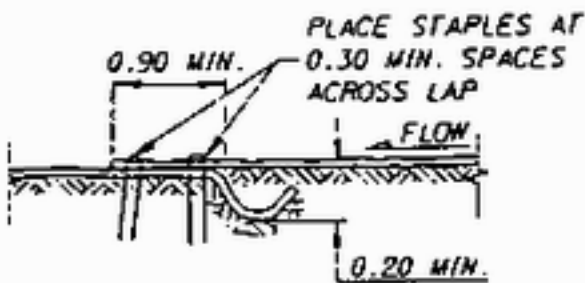
Products used for temporary control may be removed and reused, if this can be done without leaving the area susceptible to erosion.

LOCATION AND SPACING OF "U" SHAPED WIRE STAPLES OR WOODEN STAKES SHALL BE AS PER MANUFACTURE'S RECOMMENDATIONS

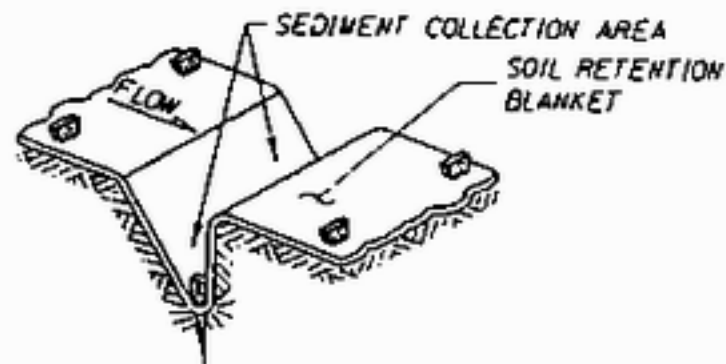
USE UPPER TERMINAL ANCHOR (SEE APPROPRIATE DETAIL)



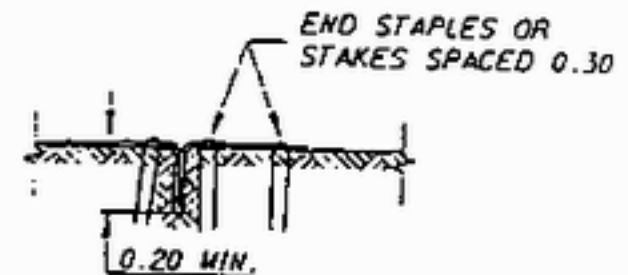
CHANNEL INSTALLATION



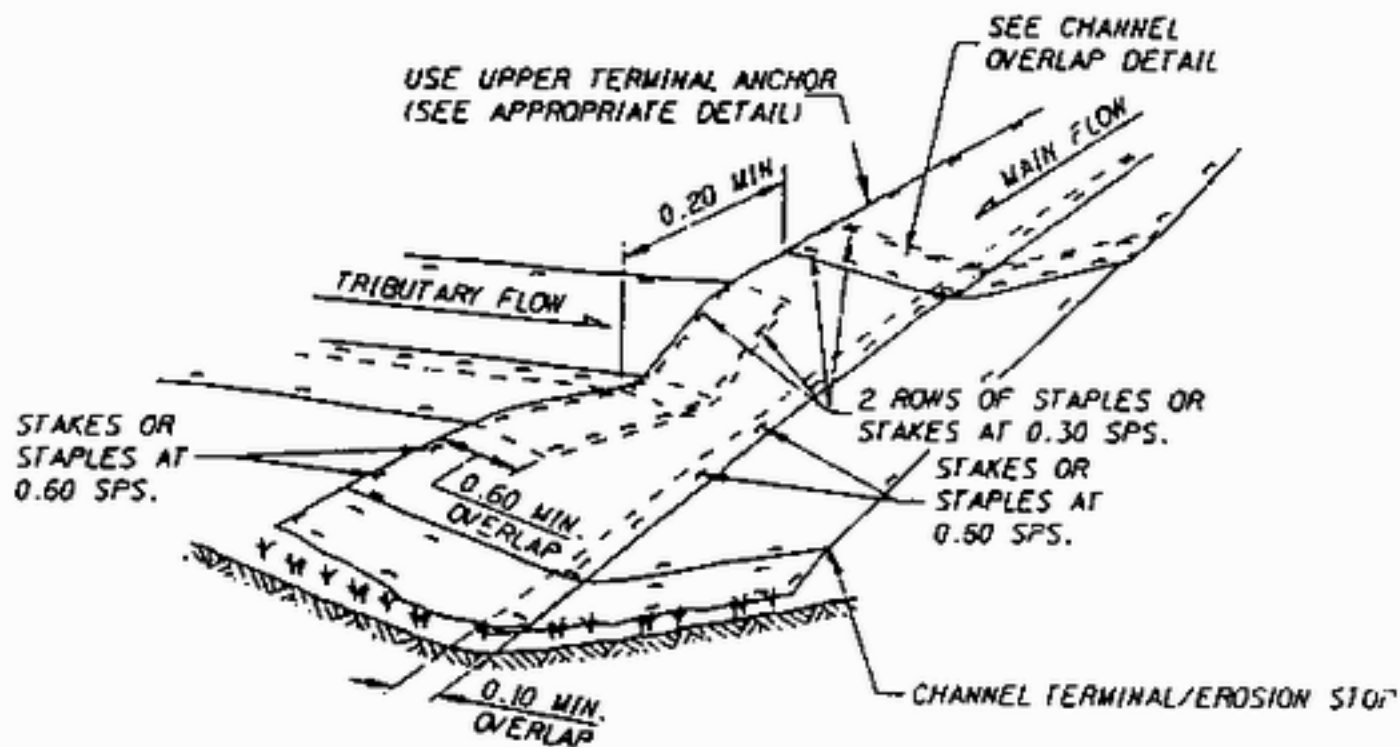
CHANNEL OVERLAP



CHANNEL CHECK SLOT



CHANNEL TERMINAL/EROSION STOP



CHANNEL INTERSECTION